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TORREYA

November, 1906

SOME PHOTOGRAPHS OF THE SILK-COTTON TREE
(*CEIBA PENTANDRA*), WITH REMARKS ON THE
EARLY RECORDS OF ITS OCCUR-
RENCE IN AMERICA

BY MARSHALL A. HOWE

A northern visitor in the West Indian islands naturally meets with many trees that are strangers to him and of these the silk-cotton tree [*Ceiba pentandra* (L.) Gärtn. — *Eriodendron anfractuosum* DC.] is one of the most interesting and imposing. In point of size and in other peculiarities the tree is so striking that it has frequently been made the subject of illustration in popular magazines and travelers' guides, and occasionally also in botanical treatises, but at this time of increasing public interest in trees it is hoped that the remarkable characters of the *Ceiba* are sufficient to justify the publication of a few more photographs for the benefit of such readers of TORREYA as have not yet enjoyed the privilege of seeing the tree itself.

Ceiba pentandra is a member of the family Bombacaceae, which is closely allied to the Malvaceae, the family to which belong the plants producing the ordinary cotton of commerce. The seeds of the *Ceiba* are covered with a soft silky fiber which is used for stuffing pillows, cushions, and mattresses. This "floss" is rather too short for weaving, but it possesses an elasticity which adapts it well for use in upholstery. From the East Indies, where also the tree occurs, large quantities of this floss are exported to Europe and America under the Malayan name "kapok," though the fiber of *Bombax malabaricum* and perhaps of other Bombacaceous trees is sometimes included under the same trade-

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name. According to Cook and Collins,* "kapok" from *Ceiba pentandra* and related species is an article of export from the west coast of Africa also.

Perhaps the most impressive feature of the *Ceiba*, apart from its general size and massiveness, is its development, with increasing age, of peculiar wing-like buttresses at the base of its trunk. These buttresses may reach out to a distance of twelve or fifteen feet from the main body of the trunk and may have an altitude of from two to twelve feet, while maintaining an almost

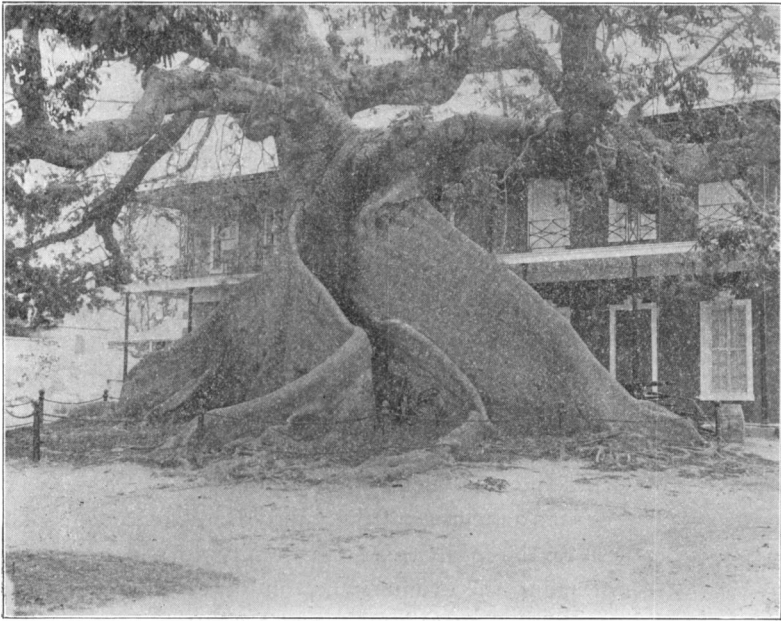


FIGURE 1. Trunk and buttresses of the great *Ceiba* standing in the rear of the Public Buildings of Nassau, New Providence, Bahamas. Photograph by Chamberlain.

uniform thickness of only a few inches. The buttresses in a well-developed condition are shown in our FIGURE 1, which is from a photograph of the famous and noble tree growing in the rear of the Public Buildings of Nassau, on the island of New Providence, Bahamas. *Ceiba pentandra* is a rapidly growing tree,

*Economic Plants of Porto Rico. Contrib. U. S. Nat. Herb. 8: 111. 1903.

but this individual, in the opinion of Mr. L. J. K. Brace of Nassau, is "fully 150 years or more old." In the public library at Nassau is a sketch representing "A View of a Silk Cotton Tree in the Island of New Providence, Bahamas, May 12, 1802"; this, by tradition and from general resemblance, is supposed to show the patriarch silk-cotton tree of the island—the one of which the photograph is here published—as it appeared in 1802. The tree at that time, according to the sketch, had young buttresses of a considerable size and in the judgment of Mr. Brace it must have been then at least 50 years old. The tolerably uniform and

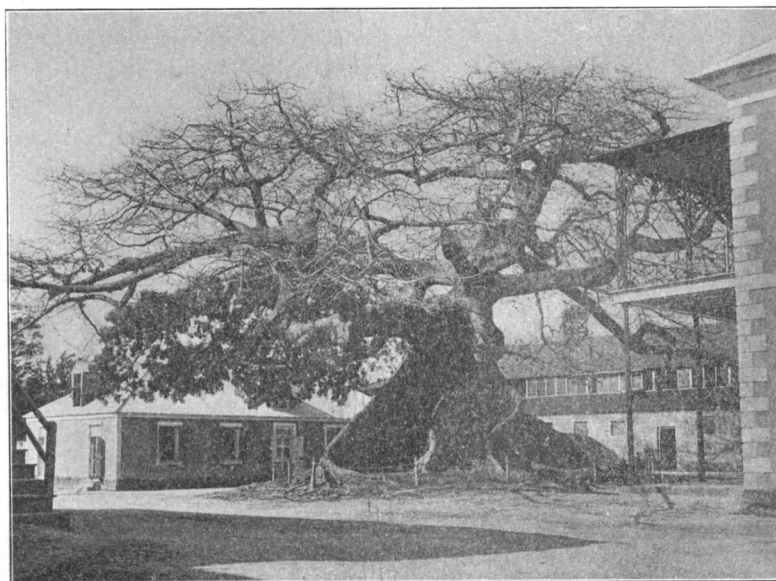


FIGURE 2. Another view of the *Ceiba* shown in FIGURE 1. Photograph taken early in March, 1905.

comparatively slight thickness of the buttresses makes it easy to cut out parts of them for use as planks or boards, and in west Africa, according to Cook and Collins (*l. c.*) "pieces of these supporting wings are sawed out and used as doors of native houses."

In the Bahama Islands and in Porto Rico, where the writer has seen the *Ceiba* growing, the tree has a rather short and stout

main trunk of about 12 to 25 feet in height up to the first branches, whence the main axis persists in diminished volume, but usually erect and easily recognizable, to the top of the tree. The main trunk, especially if one includes the basal buttresses, often has an enormous girth. According to Cook and Collins (*l. c.*) "a specimen near Ponce measured 36 meters at 4 feet from the ground, by following the sinuosities of the trunk." The main branches are very long, widely spreading and nearly horizontal, so that the horizontal diameter of the crown is sometimes more than twice as great as the total height of the tree. This feature is excellently illustrated in the Porto Rican tree of which a photograph is published by Cook and Collins (*l. c. pl. 24*) and less well by our FIGURES 2 and 6. The great spreading branches of the tree shown in our FIGURE 3 — a photograph of a tree standing on the bank of a river on the borders of the city of Ponce, Porto Rico — were put to good service at the time of the destructive Porto Rican hurricane and flood in August, 1899, when, it is said, many people saved themselves from drowning by taking refuge among the branches of this great tree. In Cuba and Jamaica, however, according to various reports, the *Ceiba* ("seiba" or "saba") sometimes takes on another form, the massive trunk running up to a height of from thirty to eighty feet * without a branch and then deliquescing into a comparatively small crown. Our FIGURE 4 illustrates such a tree growing at Mandeville, Jamaica. Mr. Norman Taylor, recently returned from a collecting expedition to the Sierra Maestra, near Santiago, Cuba, informs the writer that this form or one with a less flattened crown, is the prevailing one in the forests of that region. Professor Carl F. Baker, botanist of the Estación Agronómica Central of Cuba, also has told the writer that the form with the long trunk and less widely spreading crown is common in other parts of Cuba. The following paragraph from Macfadyen's *Flora of Jamaica* (93. 1837) gives a graphic description of this tree as it occurs in that island :

"This is a tree of rapid growth, and is readily propagated from stakes or posts planted in the ground. A superb row of these trees at

* Lunan, *Hortus Jamaicensis* 1 : 243. 1814. Macfadyen, *Flora of Jamaica*, 92. 1837. Havard, *Plant World* 4 : 222. 1901.

Belvidere pastures, St. Thomas in the East, was established from posts fixed in the earth, in making a common rail fence. Perhaps no tree in the world has a more lofty and imposing appearance, whether overtopping its humbler companions in some woody district, or rising in solitary grandeur in some open plain. Even the untutored children of Africa are so struck with the majesty of its appearance that they designate it the *God-tree*, and account it sacrilege to injure it with the axe; so that, not unfrequently, not even fear of punishment will induce them to cut it down. Even in a state of decay, it is an object of their superstitious fears: they regard it as consecrated to evil spirits, whose favour they seek to conciliate by offerings placed at its base."

Ceiba pentandra is one of the few tropical trees which has deciduous leaves, though its habits in this particular are somewhat

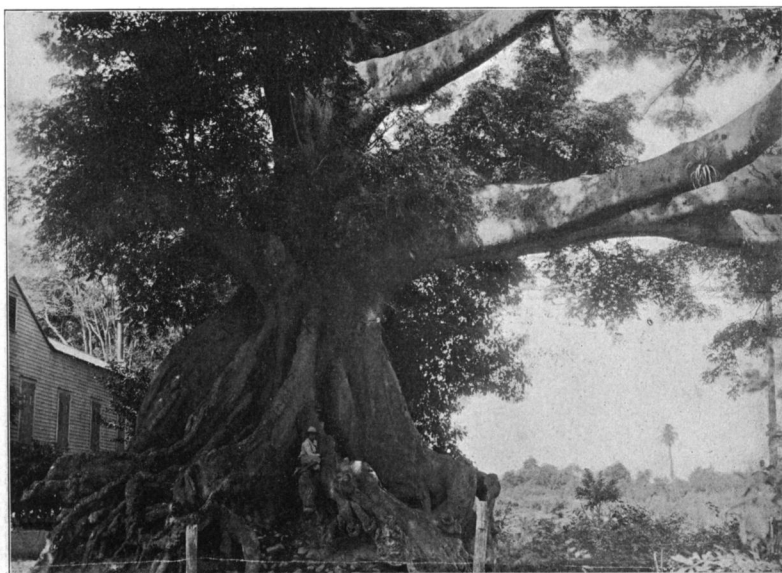


FIGURE 3. Base of a *Ceiba* growing on the bank of a river in the city of Ponce, Porto Rico. Photograph taken in June, 1903. Reproduced by courtesy of the *Journal of the New York Botanical Garden*.

erratic — a matter that has recently been discussed in an interesting way by Mrs. E. C. Anthony,* by Mr. O. W. Barrett,† and by Mr. O. F. Cook.‡ The leaves usually begin to fall at about

* *Am. Botanist* 3 : 90. 1902.

† *Am. Botanist* 4 : 91. 1903.

‡ *Plant World* 5 : 171. 1902.

Christmas time or early in January, and the trees are commonly bare the latter part of January and a considerable part of February and March, during which months the numerous pale rose-colored, clustered flowers appear, followed by the pods and the leaves. Individual trees, however, behave very differently from



FIGURE 4. *Ceiba*, at Mandeville, Jamaica.

others. The photographs reproduced in our FIGURES 2 and 6 were taken on the same day early in March in Nassau, but the two trees there represented are shown in quite different guises. The old tree in the rear of the Public Buildings, represented in FIGURE 2, had at the time one large branch which had apparently

retained its old leaves, the remainder of the crown being entirely bare or showing clusters of flowers or young pods, while at the same time the younger tree represented in our FIGURE 6 — a tree growing on the grounds of the New Providence Asylum — was laden with nearly mature pods and showed no leaves at all. Sometimes, according to Mrs. Anthony (*l. c.*), a silk-cotton tree at Nassau may omit entirely the shedding of its leaves during the winter. The bark of the *Ceiba* is covered when young with coarse, sharp-pointed, conical or pyramidal tubercles or spines,

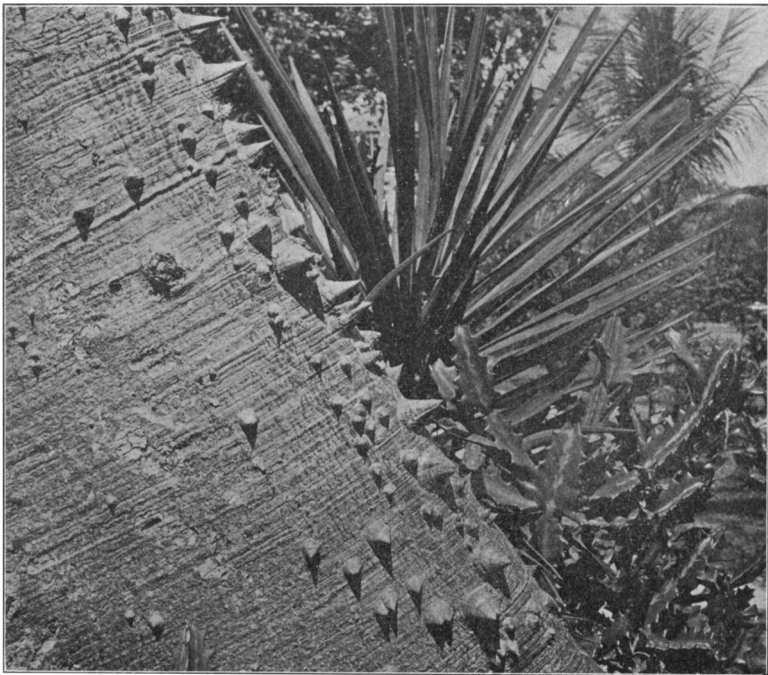


FIGURE 5. Tubercles or spines on the base of a young *Ceiba pentandra* at Nassau, Bahamas.

as represented in our FIGURE 5; but in the older trees these spines, as a rule, are scarcely found unless near the ends of the younger branches, though in this respect the trees show a good deal of individual variation.

Ceiba pentandra is now widely distributed in the tropics; oc-

curing not only in the West Indies and Central and South America, but also in the East Indies and tropical Africa. Taxonomists in attempts to separate specifically the forms growing in these widely separated regions seem able to find no distinctive characters more important than slight differences in the color of the flowers. Varietal and even specific names have been applied to forms of this tree from different parts of the world, but the practically unanimous opinion of botanists at the present day is



FIGURE 6. *Ceiba pentandra* in fruit; on the grounds of the New Providence Asylum, Nassau, Bahamas. Photograph taken in the first week of March, 1905.

that they represent only a single species. It can hardly be supposed that the tree is really indigenous in all these regions, and the question as to its original home thus becomes of interest. The *Index Kewensis* gives its range (under the name *Eriodendron anfractuosum*) as "As. et Afr. trop.," and the idea that the tree is an introduction in tropical America has occasionally found favor in other works. That the tree has been extensively planted in the American tropics is undeniable and its rapid growth and

possession of woolly seeds easily transported by the wind are facts that may be perhaps fairly adduced to account for the presence of very large trees at the present day in forests far from human habitations. Most writers, however, consider that *Ceiba pentandra* is a native of America, and the evidence that can be assembled in support of this view seems fairly conclusive. One fact of some significance is that of the nine species of the genus *Ceiba* recognized by K. Schumann in Engler & Prantl's *Die Natürlichen Pflanzenfamilien*, the remaining eight are attributed exclusively to the warmer parts of America.

Pickering in his "Chronological History of Plants" (p. 783) states that *Eriodendron anfractuosum* "was carried westward across the Pacific to the Philippines" by the European colonists, and also to the neighboring islands, to Burma, to Hindustan, to equatorial East Africa, etc., though "according to Auld seemingly 'wild in Kandesh.'" Many of the older possible references to this tree in general botanical literature are obscured by confusion with the East Indian tree now known as *Bombax Ceiba* L. (= *Bombax malabaricum* DC.), to which Linnaeus, overestimating the importance of the presence or absence of spines and supposing this Malabar tree to occur in the West as well as in the East Indies, unfortunately transferred the native American name *Ceiba*. In searching through the writings of the earliest American explorers and botanical travelers, one finds a good number of references to trees which may well have been specimens of *Ceiba pentandra*, though many of these references fall a little short of being diagnostic and conclusive. Probably the earliest and certainly one of the most significant of such allusions is found in the "Select Letters of Christopher Columbus" * and occurs in a letter written by Dr. Chanca, physician to the fleet of Columbus on his second voyage to the West Indies, and relating to the island of Española (Santo Domingo). Dr. Chanca wrote :

"We have met with trees bearing wool, of a sufficiently fine quality (according to the opinion of those who are acquainted with the art)

*66. 1870 [2d Ed.]. Translated and edited by R. H. Major. London (Hakluyt Soc.)

to be woven into good cloth ; there are so many of these trees that we might load the caravels with wool, although it is troublesome to collect, for the trees are very thorny, but some means may be easily found of overcoming this difficulty. There are also cotton trees as large as peach trees, which produce cotton in the greatest abundance."

The editor of these letters adds as a footnote after "very thorny" ("muy espinosos"): "A species of the natural order Bombaceae ; perhaps the *Eriodendron anfractuosum*." The "muy espinosos" in connection with a wool-bearing tree of Santo Domingo is of especial significance. *Ochroma* and perhaps other native trees of the West Indian region "bear wool," but none of them but *Ceiba pentandra*, so far as we know, is spiny.

Columbus relates in the account of his first voyage that many canoes were found in use by the inhabitants of the islands visited and that these canoes were made of a single piece of timber. The largest of these is referred to in the journal of Columbus for Friday, November 30, 1492, at which time the explorers were at Puerto Santo [Puerto de Baracoa] near the eastern end of Cuba ; this canoe, dug out of a single tree, was 95 *palmos* (spans) long and capable of carrying 150 persons. In parts of ancient Spanish America, *ceiba*, *ceyba* or *seiba* (written "seiba" in the older documents of Cuba) * was a native name † for canoe and also for a certain large tree ; and many of the older writers ‡ associate these large canoes with the tree now known as *Ceiba pentandra*. While possibly this is not the only kind of tree now growing in the West Indian islands which has a trunk sufficiently large for the making of such great canoes, we have the testimony also of various later writers § that the trunks of the *Ceiba* are used for making canoes, and Mr. Norman Taylor, whose return from a recent visit to the Sierra Maestra near Santiago, Cuba, has been referred to above, tells the present writer that he saw dug-out canoes made from the trunks of this tree now in actual use in that region. Professor L. M. Underwood in the course of his visits to Jamaica has been told that canoes are there also still made from the *Ceiba*.

* A. Bachiller y Morales, *Cuba primitiva*, 242. 1883.

† A. Bachiller y Morales, *l. c.* 234.

‡ Sloane, *Nat. Hist. Jam.* 2 : 72-75. 1725.

§ *E. g.*, Grosourdy, *Méd. Bot. Criollo*, 2 : 375. 1864.

The first historian of the New World, or at least the first who described the trees in much detail, was Gonzalo Fernandez de Oviedo y Valdés, who from 1514 to 1556 served in various capacities as an officer of the Spanish government in Darien, Cartagena, Nicaragua, and Española (Santo Domingo or Haïti). In 1526, he published a "Sumario de la natural y general historia de las Indias," in the course of which he remarks that "the largest tree that I have seen in these parts or in others was in the province of Guaturo." * (He had been speaking of the "Tierra-Firme" and "Darien" and this province was doubtless in the region of the Isthmus.) This great tree had "three roots or parts in a triangle after the manner of a trivet and a space of more than twenty feet was left open between each of these three" basal parts, which were also very high. There is nothing, however, in the further details of this description about the bearing of "wool," and nothing perhaps which would absolutely exclude the possibility of its being a large buttressed *Sterculia*. But in the first part of Oviedo's "Historia general y natural de las Indias," originally published in 1535, there is a chapter "On the tree called çeyba, in especial; and other big trees;" † and in this chapter, which first saw the light only forty three years after the discovery of America, we find vivid and rather detailed descriptions of very large trees, known to the natives as "çeybas," which, in our opinion, could have been nothing other than the trees now known by the name *Ceiba pentandra*, even though two or three minor inaccuracies and misconceptions are to be noted in Oviedo's graphic and manifestly conscientious narrative. This description is of so much interest that we venture to give below a somewhat free translation of it :

"Since writing what I have said of this great tree [*i. e.*, the one in the province of Guaturo, mentioned above], I have seen many others and much greater ones. And it seems to me that the çeybas are for the most part the largest trees of all in these Indies; and this tree is

* Edition seen a reprint in Biblioteca de Autores Españoles 22 : 504. Madrid, 1884.

† El Capitan Gonzalo Fernandez de Oviedo y Valdés. Historia general y natural de las Indias, islas y tierra-firme del mar Oceano. Primera parte, lib. IX, cap. XI. (In edition seen, 1 : 342-345. Madrid, 1851.)

of two kinds, one which loses its leaves, and another which never sheds them or remains always green. In this island of Española there was a çeyba, eight leagues from this city, where has persisted the name *Arbol Gordo*, whereof I now speak very often to the Admiral Don Diego Colom, and tell him that he with fourteen other men, touching hands, could not encompass this çeyba that they called *arbol gordo*. This tree died and rotted, but many people are now living who saw it and say the same of its grandeur. For me this is not much of a wonder, recalling the larger ones of these same çeybas that I have seen on the Terra-Firma. There was another great tree of these çeybas in the town of Santiago, in this island of Española ; but both this one and the other are much smaller than those that are found on the Terra-Firma.

Since in the province of Nicaragua are the greatest trees which I have seen up to this time and which much exceed all that I have told of, I will now speak only of one çeyba which I saw many times in that province, not half a league from the house and seat of the chief of Fhecoatega, near a river belonging to the district of the chief of Guaçama, who was under the protection of a man of property named Miguel Lucas or of his partners Francisco Nuñez and Luis Farfan. This tree I measured by my own hands with a hemp cord and it had a circumference at the base of thirty-three yards, which equals one hundred and thirty-two spans ; and since it stood on the bank of a river it could not be measured low about the roots on that side and it should be without doubt three yards larger ; all put together, well measured, I estimate that it was thirty-six yards, or one hundred and forty-four spans, in circumference. This is the largest thing in the tree line that I have seen.

The wood of these çeybas is soft and easy to cut and of little weight and the tree is not held in esteem for building or for more than two purposes. One is its wool and the other the shade, which is extensive, for these are great trees with very spreading branches, and the shade is healthful and not heavy like the shade of other trees that exist in these Indies, which are notoriously harmful ; like that of the tree from which is made the poison with which the Carib Indians charge their arrows. The fruit of these trees is a pod, shaped like the largest finger of the hand, but as thick as two fingers, rounded and full of delicate wool ; after ripening, these pods dry and open through the heat of the sun, and then the wind carries away the wool, in which are certain little grains which are its seed, as is the case with the cotton. This wool appears to me to be a notable thing and the fruit of the çeyba is after the manner of the bitter cucumbers of Castile, except that the fruits of the çeyba are larger and thicker ; but the largest is not longer than the great finger of the hand ; and when it is ripe it breaks lengthwise into four parts, and with the first wind is seen the wool (this fruit has nothing else within it) and it looks as if it has snowed wherever the wool has sufficed to cover the ground. This wool is short and it seems to me that it could not be spun into thread ; but for bed-pillows and cushions of the drawing-room (free from wet)

it is a wool unique in its softness and without any ill effects to the head, and for the couches of princes the most delicate and estimable of all the wools; it is a silk and even more delicate than the subtile threads of silk. So, no feathers or wool or cotton can equal it; but, if it is wet, it all becomes balled and loses itself. I have experienced all this, and so long as this wool does not become wet there is none like it for cushions and pillows. The Indians in Nicaragua are accustomed to have appointed places for the *tiangüez*, that is to say, the market, where they come together for their gatherings, their fairs, and their barterings, and there they have two, three, and four trees of these ceybas to give shade; and in many plazas or *tiangüez*, two or three or four ceybas suffice to give shade to a thousand and two thousand persons, and they arrange the ceybas according as the concourse of the plaza or *tiangüez* is large or small. This great tree, which in this island [Española], they call ceyba, as I have said, is called *poxot* in the province of Nicaragua and in other parts bears other names."

Bartolomé de las Casas, Bishop of Chiapa, the famous pioneer missionary to the New World and defender of the Indians against their Spanish conquerors, came to Española in 1502, and spent the greater part of his long life in the West Indies, Venezuela, Peru, Central America, and Mexico. His "Historia de las Indias" was known only from manuscript copies up to 1875-76 and seems not to be alluded to by any of the authors who have dealt with the silk-cotton tree, the present writer being indebted to Dr. Manuel Gómez de la Maza, of the University of Havana, for a reference to it. The description of the "ceyba" given by Las Casas is not so detailed as that by Oviedo, yet it is at least of confirmatory interest. A free translation of a part of his description* runs about as follows:

"There is in this island [Española], and commonly in all these Indies, where the land is not cold but rather warm, trees that the Indians of this island call *ceybas*, the letter *y* long, which are commonly so great and of such copiousness of branches and dense leaves that they will give shade for 500 horses, and some will cover much more; it is a very magnificent, showy, and graceful tree; its principal trunk has a thickness of more than three and four oxen, and some are found, and I believe there is one on the island of Guadeloupe, that 10 or 12 men with opened arms and even with two pairs of breeches outstretched could not encompass, and I so affirm. * * * The mast or principal trunk before the branches commence is two to three lances

* Las Casas. Historia de las Indias. Coleccion de Documentos Inéditos para la Historia de España, 66 : 322, 323. 1876. [Apéndice, capítulo XIII].

in height ; the first branches commence not from below upward as in other trees, but extend very straight out for such a distance that it seems marvelous that they do not break with the weight that they carry, and it is on this account that they are so capacious and make so much shade ; these branches are commonly as thick as a man's body * * * ; the leaves are dark-green, delicate and toothed,* if memory serves me well ; I do not know that there is in Castile anything to which to compare them, unless it may be, if I am not mistaken, those of what we call the tree of paradise."

In view of the evidence of the kind quoted and of various corroborative traditions,† it would appear that tropical America has a good claim to being considered the native home of the silk-cotton tree. Just what the direct evidence may be for Pickering's‡ unqualified assertion that the tree "by European colonists was carried westward across the Pacific to the Philippines," and also to India and Africa, we have been unable to discover, but the idea seems plausible. Mr. George Watt, in his "Dictionary of the Economic Products of India" § remarks that "No writer definitely affirms that *Eriodendron* is wild ; nearly all speak of it as cultivated." If evidence can be found showing the existence of this tree in the East Indies prior to the discovery of America, it will naturally raise some interesting questions of the kind recently discussed by Mr. O. F. Cook,|| who finds grounds for believing that the cocoa palm and several other important food plants of wide distribution in the tropics originated in America

* The editor of the "Historia" states that Las Casas began the writing of it when he was 78 years old, which would be after his return to Spain.

† There is a Cuban tradition to the effect that the first mass on the present site of the city of Havana, in 1519, was celebrated, according to a tablet erected in 1754 in commemoration of the event, under "una frondosa seiba." A photograph of this tablet is reproduced in "El Mundo Ilustrado" of November 20, 1904 (p. 310), a copy of which we owe to the courtesy of Professor de la Maza of Havana. The accompanying account in "El Mundo Ilustrado" states that the original ceiba was cut down in 1753, was replaced by another which dried out during the building of the commemorative "El Templete" in 1828, but seeded two other trees, one of which still remains.

‡ Chronological History of Plants, 783.

§ 3 : 260. 1890.

|| The origin and distribution of the cocoa palm. Contr. U. S. Nat. Herb. 7 : i-v, 257-293. 1901.

The American origin of agriculture. Pop. Sci. Monthly 61 : 492-505. O 1902.

and were transported by human agencies to Polynesia, the East Indies, and Africa, in very remote times, or at least in times much antedating the discovery of the New World by the Spaniards.

A MISSISSIPPI ALETRIS AND SOME ASSOCIATED PLANTS

BY E. J. HILL

In 1858 I was engaged in teaching at Starkville, Mississippi. Some of the spare hours were given to the study of the plants of the locality. A physician of the place wishing to obtain the colic-root (*Aletris farinosa*), the few books on botany accessible were consulted to ascertain the kind of ground in which it was likely to be found. It was decided to try the pine-barrens west of Starkville. A drive of a few miles through a rich farming region brought us to one in great contrast with it. Crossing a small stream, named in my note-book, Trim-Cane creek, we were abruptly brought into the barrens with their dry, sandy soil and corresponding flora. Only a short time passed before I found a plant which answered the description of an *Aletris*. As there were but two species mentioned in the manuals, *A. farinosa* L. and *A. aurea* Walt., the one discovered, having white flowers, was identified with the former. The leaves at the base of the stems did not agree very well with those described, but being of little experience in the study, I was not as much disturbed by the discrepancy as would have been the case in after years. Having taken a few more plants we returned to Starkville. The time of collecting was May 22, 1858. What use the physician made of the *Aletris* I do not know. A couple of months from that time I returned to New York, not to go back to Mississippi again.

In 1863 I came to Illinois to reside. The place was just south of Chicago, and the first summer in the state revealed the real *A. farinosa* in the sands of the former bed of Lake Michigan. It had radical leaves quite different from the obovate or oblanceolate form in the single example of the Mississippi plant that